

Annual Event Rescheduled to October 7th

Weather Scuttles RVAS Picnic Plans

By Frank Baratta, Treasurer

It was the way it was supposed to be. Bright morning sunshine streaming in, birds chirping gaily and mild fall temperatures forecast. Even the air quality was good. The day was full of promise for a great outdoor event. There was only one problem. It was Sunday, the 24th, the day after the day planned for our annual picnic and star party.

Thanks to the untimely passage of tropical storm Ophelia, picnic day was a downer: cloudy, wet and chilly. A bad day sandwiched—almost tauntingly—between good ones. And the lead up to our scheduled date left little chance that it would be different. Early on Saturday, the 23rd, **RVAS President Mike Hutkin** issued the inevitable postponement.

We've rescheduled our annual event to Saturday, October 7th, two weeks later, but with the time, place and other details unchanged. And, whereas September wound up with neither a monthly meeting nor a picnic, October will have both. As it happens, we have a guest speaker lined up for October. See elsewhere in this issue for more on that.



Scene from last picnic at ARF, October 12, 2019. Photo by Michael Good

Our original and rain dates for the picnic each fell one day past first quarter and full moon, respectively, meaning washed out night skies. October 7th, one day past third quarter, offers much better observing possibilities. It took some fine planning acumen on the part of our President and help from Apple Ridge Farm to line up October 7th.

Aware of where weather matters were heading, **Mike** worked with ARF to switch what had been our rain date (September

(Picnic Continued on page 2)

30th). Fortunately, ARF had October 7th open and graciously agreed to the switch.

Compared to what had been our rain date, the major difference for observing offered by October 7th is the absence of the moon, which sets at 3:46 p.m. At 6:54 and 8:21 p.m., respectively, sunset and the end of twilight arrive—about 10 minutes earlier than their September 30th counterparts. Meanwhile, Saturn's location and the orientation of the Milky Way are little changed. Jupiter clears the east-northeastern horizon about 30 minutes earlier than on our prior rain date, but remains low for decent viewing. Among the stars, the Summer Triangle of Vega, Altair and Deneb is high above, with the Great Square of Pegasus and its entourage of fall patterns rising toward zenith. Without moonglow to interfere, star clusters, nebulae and galaxies will make tempting targets.



Saturn and its four brightest moons at 9:00 p.m. on October 7th. Stellarium graphic by Author

In short, reset your calendars and plans and let's all set our positive thinking toward enjoying a great event on October $7^{\text{th}}!$

RVAS Member Anniversaries

Congratulations to the following members who reach the indicated number of consecutive years with the RVAS since joining or re-joining during the month of October:

Bob Richert (1989) - 34 years Ellen and Roger Holtman (1992) - 31 years Roger Pommerenke (1995) - 28 years Randy and Vivian Sowden (2005) - 18 years Ray Bradley (2014) - 9 years Robert and Rhonda Capobianco (2019) - 4 years

Thanks to all of you for being RVAS members!

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of observational and photographic astronomical activities. **Meetings are held at 7:30 p.m. on the third Monday of each month. See calendar on last page of newsletter for location. Meetings are open to the public**. Observing sessions are held one or two weekends a month at a dark-sky site. For information regarding joining RVAS, including annual dues, <u>click here</u>. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

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> > RVAS web page: http://www.rvasclub.org

What's Up? Highlights October 1 to 31, 2023

(Given the absence of a regular September monthly meeting, no What's Up? PowerPoint is available for viewing.)

This Month:

Our all-sky map is set for mid-October a half hour before full darkness. Interestingly, at that time rising Jupiter and the setting moon are almost exactly diametrically opposite each other. On October 7th, the date of our rescheduled annual picnic, the moon will have set almost 4 hours earlier and Jupiter will be rising about 40 minutes later than the time of the map. Otherwise, the constellations' positions will be much the same as the map's. Of course, October's major celestial event is the annular solar eclipse on the 14th. The path of annularity crosses from Oregon to Texas. Only those within the 137 to 122 mile wide path will see the sun's ring surrounding





the dark lunar disk. We here in Roanoke will see a partial eclipse with the moon biting a bit less than halfway into the sun, as shown in this Stellarium graphic.

Celestial Events:

- · Mon., 9th The eclipsing binary star Algol shines at minimum brightness for about 2 hours centered 11:42 p.m. EDT and again on Wednesday, the 12th, for about 2 hours centered on 8:30 p.m. EDT.
- Tue., 10th Early risers with dark skies can catch a lineup of the 16% illuminated waning crescent moon, Regulus and Venus before morning twilight begins at 5:56 a.m. The trio spans just a bit over 6°.
- Tue., 10th The moon is at apogee; distance 251,919 miles; diameter 29' 28".
- · Sat., 14th Solar Eclipse. Annular for 9 western states, but partial for the Roanoke area. Begins 11:52 a.m.; maximum 1:15 p.m. (magnitude 0.488); ends 2:40 p.m. All times are local times for Roanoke.
- · Sat./Sun., 21st/22nd Orionid meteor shower peaks at 8:05 p.m. on 21st. Best after midnight. Up to 20 meteors per hour under a dark sky. Occasional persistent trains and some fireballs associated with shower.
- Wed., 25th The moon is at perigee; distance 226,722 miles; diameter 32' 45" (11.1% wider than on 10th).

Sunset and Twilight:

Sunset Range: 6:43 p.m. (Oct. 1st) to 6:24 p.m. (Oct. 31st) Twilight Ends: 8:08 p.m. (Oct. 1st) to 7:51 p.m. (Oct. 31st)

Weekend Observing Opportunities: (Dark of the Moon Weekends)

Oct. 6th/7th Oct. 13th/14th

Moon Phases:

Fri., 6th - Last Quarter Sat., 14th - New Moon Sat., 21st - First Quarter Sat., 28th - Full Moon

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Roanoke Valley Astronomical Society Monday, October 16, 2023, 7:30 PM

"NASA's Webb Telescope - The First Year"

Presented by

Christopher Britt, PhD Space Telescope Science Institute



Christopher Britt Education and Outreach Scientist in the STScI Office of Public Outreach

The James Webb Space Telescope is NASA's most complex and ambitious space telescope project, undertaken in partnership with the European and Canadian space agencies and a multitude of other organizations. Launched Christmas Day in 2021, Webb became fully operation in July 2022. Over the course of its first year, the world has been captivated by the stunning images it has returned, the scientific data it has obtained and the questions these have posed to our prior understandings. Dr. Christopher Britt spoke to the Society in June 2022 and returns (via Zoom) as our October featured speaker to provide an overview on the first year of science and any latest Webb science news. Be sure to join us for the October meeting and Dr. Britt's talk.

Dr. Britt serves as the STSCI Scientist for Webb News on the news team. He earned his PhD from Louisiana State University in 2013, followed by postdoctoral positions at Texas Tech University and Michigan State University, where he used ground- and space-based observatories to study accretion onto the compact remnants of dead stars. He has been at STSCI since 2018, where he works with the Hubble and Webb missions as well as NASA's Universe of Learning to deliver accurate and engaging science to diverse communities around the country.

Welcome Mat

The Society bids a warm welcome to Robert Gould and Paola Montoya, of Roanoke, who became members early last month. Robert joined with an Individual membership, while Paola took advantage of our Free Introductory Student membership offer. A native son of Philadelphia, PA, Robert spent most of his pre-Roanoke years in Charlotte, NC, except for five years in Los Angeles. Paola was born and raised in Bogota, Colombia, until moving to the U.S. when she was 17. The two met while living in Charlotte 5 years ago and are engaged, though they have yet to set a date. They arrived in Roanoke in early 2020, just as COVID began its rise to a pandemic. Paola's in grad school at Radford University pursuing a career as an occupational therapist; Robert earned his Master's from the New York Film Academy and applies his skills and talents for the American Public University System. Robert and Paola have long been fascinated by gazing at the night sky and contemplating the mysteries of the cosmos. Seeking an astronomy group to further develop their interest led them to our Facebook page. Robert had been a member of the astronomy club at UNC-Charlotte during his undergrad days, but we're Paola's first such experience. Both are excited about connecting with other astrophiles, learning and sharing experiences, and getting out under the stars. Neither owns any astronomical equipment currently, but Robert hopes to make "an educated buy" as soon as possible. Meanwhile, he and Paola continue to keep track of the Moon and planets with their unaided eyes as often and as much as the skyglow around them permits. Asked what other hobbies they have, Robert calls himself a "filmophile"; Paola loves dancing. Both are animal lovers—they own two dogs and a cat—and foodies. Both have a wide-ranging curiosity and an affinity for kind people.

Robert and Paola, we're glad to have you as members! Thanks for joining. You did so at a very opportune time, given the club's upcoming annual picnic and star party. We're looking forward to meeting and welcoming both of you at the event, and beginning to build ties with your new club friends.

RVAS October 16th Monthly Meeting In-Person and Zoom

Members and guests may attend in-person or via Zoom. Our informal "Celestial Café" chat session begins at 7:00 p.m., with the regular meeting to follow at 7:30 p.m. Mask wearing is optional for both in-person gatherings. The evening features the return of Dr. Christopher Britt, Education and Outreach Scientist at the Space Telescope Science Institute's Office of Public Outreach, Baltimore, Maryland. Dr. Britt will offer an overview of the James Webb Space Telescope's first year, its scientific contributions and the latest news about this remarkable instrument.

Our meeting place is Virginia Western Community College's Natural Science Center. It's located on the south side of Colonial Avenue, above the Community Arboretum, and is accessed via the roundabout at Winding Way. The Natural Science Center (marked "N" and circled in red) and adjacent parking (also circled in red) are indicated on the map below. Our thanks to VWCC and RVAS member Dr. Mallory White, Assistant Professor at VWCC, for the use of these facilities.





RVAS Annual Picnic and Star Party

Apple Ridge Farm, Copper Hill (Floyd Co.) Saturday, October 7, 2023, 4:00 – 10:00 PM (Note: The RVAS will also hold its October 16th monthly meeting.)



Annual event for RVAS members and their families. "Tailgate Style Picnic" - Bring your own food, beverages (no alcohol, please) and other dinner needs. Bring your own folding chairs, if desired. Door prizes, silent auction, giveaways and evening observing at ARF observatory! Members are welcome to bring their own scopes.

Directions from Roanoke to Apple Ridge Farm

Rt 221 South up Bent Mountain to Copper Hill

In Copper Hill, turn Right onto Rt 796

Continue 0.8 mile on Rt. 796 until it meets and becomes Rt 645 (bear left onto Rt 645)

Continue 0.2 mile on Rt 645 and bear right onto Rt 644 (Pine Forest Road)

Continue 1.3 miles on Rt 644 to ARF entrance

Drive past the Lewis' house, up the hill and around to parking area between tennis/basketball courts and pool.

See map below.





This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach.

Visit <u>nightsky.jpl.nasa.gov</u> to find local clubs, events, and more!

From Galileo to Clipper, Exploring Jupiter's Moons

By Vivian White

"...We, too, are made of wonders, of great and ordinary loves, of small invisible worlds, of a need to call out through the dark." From In Praise of Mystery: A Poem for Europa by Ada Limon



As autumn begins, if you're up late, you may notice a bright point of light rising in the east. Look a bit closer, with a pair of binoculars, and you'll notice it's not a star at all. While stars look point-like no matter how big your backyard telescope, this light appears as a circle under closer examination. Even more curious, you will likely see a line of smaller dots on one or both sides. Congratulations! You've rediscovered the king of the planets - majestic Jupiter - and its four largest moons.



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Galileo's drawings of Jupiter and its Medicean Stars from Sidereus Nuncius. Image courtesy of the History of Science Collections, University of Oklahoma Libraries.

Galileo famously chronicled the four moving dots near Jupiter and surmised that they were orbiting the distant world. While Jupiter has well over 80 discovered moons as of September 2023, these brightest four are called the "Galilean Moons" - Io, Europa, Ganymede, and Callisto. (Great mnemonics exist to remember these in order of distance from Jupiter, such as "I Eat Green Caterpillars") You can follow these like Galileo did, using stargazing apps or the handy image below. A favorite beginning observing challenge is to track the movement of the Galilean Moons over the course of many nights. Even within a few hours, you will notice them moving in relation to Jupiter, just as Galileo did.

Fast forward 414 years, and NASA will be sending a robotic mission to investigate the surface of one of these distant worlds. The <u>Europa Clipper Mission</u> is launching to the cold, icy moon in 2024, to begin orbiting in 2030. With its salty oceans covered by ice, Europa was chosen as an excellent location to continue the search for life outside of Earth. Clipper will be the largest spacecraft ever sent to another planet, designed to withstand Jupiter's punishing radiation. Once it arrives at Jupiter in 2030, NASA plans to do about 50 flybys of Europa, mapping almost the entire surface of this watery world.



The position of the Galilean Moons of Jupiter in October 2023: <u>https://in-the-sky.org/jupiter.php</u>

What was once only dreamed of in the small telescope of Galileo, or in great works of fiction, NASA is turning our wildest imagination into reality. One of the celebrated quotes from the classic 2010: Odyssey Two warns, "All these worlds are yours, except Europa. Attempt no landing there." Science fiction fans can feel relieved knowing that writer Arthur C. Clarke gave his blessing for the Europa Clipper mission.

Join the Europa Message in a Bottle Campaign to send your name with the spacecraft, hear the rest of the poem by the US Poet Laureate, and learn more about the wonders of space travel with the Clipper Mission: https://europa.nasa.gov/ participate

Watch a wonderful Clipper webinar with Dr. Cynthia Phillips, planetary geologist with the mission: <u>https://www.youtube.com/</u> <u>live/RnnLJBLRBCA?feature=shared&t=269</u>



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Stock will arrive in typically in November and typically ship in December in time for Christmas. We suggest ordering early to ensure availability, as stock will be limited once the order comes in. If we have your order early, then we will order enough product for you.

A Book Review And Some Musings of My Own

By Judy Starr Hopping

On the Origin of Time: Stephen Hawking's Final Theory

By Thomas Hertog

Stephen Hawking and the author worked closely together. Hawking was a physicist famous for his brilliance, his groundbreaking work on black holes, his bestselling book *A Brief History of Time*, and for his prolonged battle with ALS, a progressively paralyzing disease that finally took his life (in 2015). Hawking, whose life work was on theories of the origin of the universe, had ideas on cosmology that evolved through the years. In this book Hertog presents Hawking's last theory. He also speaks of the philosophical approaches to scientific inquiry that Hawking and his predecessors wrestled with. And he briefly addresses the concept of the multiverse-a continually branching multiplication of universes-a concept that Hawking ultimately rejected.

The book starts (Chapters 1-6) with an overview of some of the theoretical developments of the last 100-plus years. Outlines of the basic theories came together quickly, in the 1920s. The twin pillars of the accepted theoretical model are Einstein's relativity (for the macrocosmos) and quantum physics (for the microcosmos).

Hertog focuses on the pivotal role of Georges LeMaitre, the often-overlooked Belgian Catholic priest/scientist, who was one of the first to recognize the implications in Einstein's General Relativity (published 1915). Einstein clung to a belief in an eternal, static universe for years, but LeMaitre saw that the theory suggested a dynamic, big-bang beginning. The term "Big Bang" came into use much later; LeMaitre called the initial point of origin the "Primeval Atom."

This overview is beautifully written. Throughout Hertog interweaves some anecdotes of his friend Stephen. His deep caring and respect for this man shines through. Hawking had the assistance of the best technology aids on the planet. But it is awful to read how eventually he had to manipulate his wheelchair and voice synthesizer through the remaining muscle in one finger, and, as that failed, through the movements of his eyes. Yet his passion and his commitment to his work made him persevere, made him want to live.

Chapter 7 is about the specifics of Hawking's final theory. Here I suddenly found the prose and the concepts impenetrable. I had to put the book aside. When I tackled it again, I took a different approach. For an overview, I just read a couple of sentences of each paragraph. This helped, and the last page or two I was able to read straight through.

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Did I really get the gist? No; the underpinnings were too unfamiliar. Hawking repeatedly likens the universe to a hologram or holograph. Hertog does not explain precisely what these are. The theory has something to do with the information that can be encoded on the surface of a black hole. But what is this information and why is it relevant? Is it instructions?

Hawking characterizes his approach as "top-down" instead of the traditional "bottom-up" approach, where complexity emerges from a few fundamental laws and constants. Regarding emergence, if anything is a fundamental property from which other properties emerge, it is not space or time in this construct but quantum entanglement. Entanglement is the strange phenomenon where you can have a pair of quantum particles that are correlated, with exactly the same characteristics, like spin, charge, momentum. If one alters any of the characteristics of one of the pair, the other is instantly transformed in the same way-even if the pair have diverged and traveled lightyears apart. Thus entanglement violates the central principle of Special Relativity, that nothing in the universe can travel faster than the speed of light. Einstein called this finding "spooky action at a distance" and deeply distrusted it.

Here the top-down approach leaves room for the central role of observers in quantum physics, who (it has been long established) can affect the behavior of quantum particles by what they choose to measure. Therefore, in some sense, the origins of our universe are at first somewhat vague and fuzzy. In the figure caption on p 241, Hertog expresses this as "...the past is in some sense contingent on the present." (So ordinary causality goes out the window? Hmmm.) Hawking also thinks that the laws and constants-the speed of light, particle masses, and so on-may be "frozen accidents"--somewhat random occurrences that, early on, evolved, just like the tree of life does in biology. (However, if they were so accidental, how did they get so fine-tuned as to favor the emergence of complex structures, such as elements, stars, planets, organic molecules?--see the Anthropic Principle).

The theory of origins outlined here has little to say about the eventual fate of the universe. Perhaps Hawking died before he could elaborate further.

These lines from Robert Frost come to mind:

Some say the world will end in fire/Some say in ice/From what I've tasted of desire/I hold with those who favor fire....

It was only 40 or 50 years ago that scientists believed that the initial momentum of the Big Bang, which created space and time and an expanding universe, would gradually diminish and even stop. Thismight allow gravity to slowly take over and cause the universe to collapse in on itself

(Review Continued on page 13)

and end in a fiery crunch. This crunch, though, could result in a pleasing bounce-with a new universe born in a new Big Bang. And this cycle could repeat.

But in the last 30 years or so, observations have shown that expansion is not slowing but accelerating. It seems a mysterious "dark energy" is driving this trend. Some say this energy derives from the virtual quantum particles that continually appear and disappear in nanoseconds in the foam of space-time. And the more space expands, the more virtual particles there are to boost the expansion rate.

As space expands, everything gets farther and farther apart. If this trend continues all the visible stars that can be seen from any planet will gradually slip beyond the horizon, until any sentient being gazing upward at the night sky will confront only emptiness. All heat will dissipate, and after eons, entropy (disorder) peaks, the ice will break apart and the last protons decay.

Can this bleak vision come to pass? I take comfort from the fact that scientists have been wrong before. There is so much we don't know. There are "known unknowns" and "unknown unknowns," as Donald Rumsfeld once said in a completely different context.

And what began the Beginning? Physicists are more comfortable speculating about the end than about the ultimate cause. Late in this book Hertog quotes Wittgenstein: "Of what one cannot speak, thereof one must be silent." Clearly, there is a profound mystery at the heart of all existence. At which awed reverence may be the only proper response.

Conclusion. I was stunned by the eloquence of the last chapter.

Hertog talks of the thinker Hannah Arendt and her feeling that scientists and reductionist approach were in danger of creating a climate of what she calls "earth alienation". She felt a threat to humanism. Hertog then delves into a famous anecdote about the physicist Enrico Fermi.

Once, among a group of his colleagues, Fermi exclaimed "Where is everybody"? They all knew what he meant. If extraterrestrial life exists, why haven't we seen it? Within our visible universe, there may be billions of solar systems, many far older than ours, where life would have had plenty of time to evolve and reach the stars. Hertog feels that colonizing other planets within our own Milky Way galaxy would only take a few million years-not that long in the grand scheme of things. There would be evidence of this-radio transmissions, other tangible evidence. And yet, despite the claims of UFO enthusiasts, there is none. here are two possible explanations for this. The first is that the myriad steps necessary for life to arise and to evolve conscious minds are so rare and unlikely that we are, indeed, alone. The second explanation (and Hertog says that this was Fermi's intuition) is that any race of beings capable of mastering the physical laws, and with the temperament to pursue this path, will inevitably fall into disharmony with their natural environment, destabilize their world, and self-destruct. This possibility presents a terrible warning to us. 1

Hertog makes an impassioned plea for scientists to step up-become public intellectuals-to fight to use our technologies for good and not for evil or merely for profit. He mentions the threats of not only nuclear war, but AI, biotech, and global heating (I love the way he uses the phrase"global heating" and not the wishy-washy "global warming" or the oh-so-neutral "climate change").

Hertog ends with a tribute to Hawking and tells how his final theory is grounded in a humanistic, compassionate vision. This concluding chapter can, and should, be read by people who don't understand a single thing about Hawking's last theory.

Read this portion-and be moved.

¹ Fermi knew something about this topic. His work in Chicago, in creating the first self-sustaining nuclear chain reaction in 1942, was integral to the success of Oppenheimer and his team in Los Alamos.

Use Our Message Line!

Want to check whether anyone is getting out on a scheduled observing session night or share that you're planning to do so? Have questions about the club or need its assistance? Call the RVAS Message Line, 540 -774-5651, and leave a message or listen for any information available.

Wanted

Astro photos for publication on the RVAS Web page, or in the RVAS Newsletter. Send the photos to editor@rvasclub.org. Observing reports and articles are also welcome.

Monthly Calendar

RVAS 2023 Picnic and Star Party: Saturday, October 7th, 4:00 p.m. to 10 p.m., Apple Ridge Farm, Copper Hill. Our rescheduled annual event for RVAS members and their families. "Tailgate Style Picnic" -Bring your own food, beverages (no alcohol, please) and other dinner needs. Bring your own folding chairs, if desired. Door prizes, silent auction, giveaways and evening observing at ARF observatory! Members are welcome to bring their own scopes. See elsewhere in this issue for additional information, directions and ARF map. Mark your calendar and be sure to join in the fun!

RVAS October Monthly Meeting: Monday, October 16th, 7:30 p.m. (Informal "Celestial Café" chat session begins at 7:00 p.m.) Natural Science Center, Virginia Western Community College, Colonial Avenue, Roanoke, VA. Yes, it's true! Having postponed our picnic last month, which took the place of the September monthly meeting, we're making it up by having both in October! And, what's more, we'll enjoy (via Zoom) the return of Dr. Christopher Britt as our special guest speaker. Dr. Britt is Education and Outreach Scientist at the Space Telescope Science Institute's Office of Public Outreach. He'll be sharing an overview of the James Webb Space Telescope's first year of operation and the latest news about this extraordinary instrument. See elsewhere in this issue for additional information. And watch for the Zoom invitation email in the days prior to the meeting.

WEEKEND OBSERVING OPPORTUNITIES: The following information on Fridays and Saturdays that may be suitable for observing is provided as a courtesy to RVAS members and other readers. The RVAS assumes no responsibility for the health and safety of anyone venturing out to stargaze, and cautions all who may do so to observe appropriate health and safety precautions.

- Friday and Saturday, October 6th & 7th. Sunset is at 6:57p.m. Astronomical twilight ends at 8:22 p.m. The Moon sets at 3:04 and 3:46 p.m., respectively.
- Friday and Saturday, October 13th & 14th. Sunset is at 6:47 p.m. Astronomical twilight ends at 8:12 p.m. The Moon sets at 6:24 and 6:46.m., respectively.

Future Weekend Observing Opportunities: November 3rd & 4th; 10th & 11th.

Astro-Quiz

Is the moon upside down in the other hemisphere?

Answer to Last Month's Quiz: Last month we asked how many days out of its average 29.5-day synodic cycle is the moon visible? According to EarthSky:

A longstanding, though somewhat doubtful, record for youngest moon seen with the eye is by two British housemaids. They said they saw the moon $14\frac{3}{4}$ hours after new moon in the year 1916. Stephen James O'Meara achieved a more reliable record in May 1990, when he saw the young crescent with the unaided eye 15 hours and 32 minutes after new moon. The record for youngest moon spotted with the eye using an optical aid passed to Mohsen Mirsaeed in 2002, who saw the moon 11 hours and 40 minutes after new moon.

However, on July 8, 2013, the French amateur astronomer Thierry Legault, who specializes in astrophotography, recorded the youngest possible moon sighting—at the exact instant of new moon when it was less than 5° from the sun!—using special equipment to capture the image in the close infrared. So, how many days out of its 29.5-day synodic cycle is the Moon visible? Apparently, 29.5—if you have the proper knowledge and equipment. To read more about Legault's extraordinary feat, go to <u>www.astrophoto.fr/</u> <u>new moon_2013july8.html</u>. Remember: NEVER EVER try to look at the sun without proper equipment. Doing so can result in permanent blindness. Have an answer to this month's quiz (or a future quiz question and answer to suggest)? E-mail it to astroquiz@rvasclub.or!